

## Appendix C

### *Herbicide Descriptions*

This appendix summarizes Borax and the seven herbicide active ingredients that are likely to be used under the Proposed Program and Alternatives 3 & 4. Herbicide treatments under Alternative 1 (Status Quo) would continue as currently done, to a limited extent, in the California Forest Improvement Program (CFIP). Although atrazine is discussed throughout the VTPEIR, it will not be funded for use under the Proposed Program and Alternatives 3 & 4, so it is excluded from this description list.

Herbicide treatments will be used in conjunction with other vegetation management treatments to reduce risks of catastrophic wildfires that result in loss of habitat, property and life. Forest and range habitats may also be improved by using herbicides to kill noxious and invasive weeds, while promoting growth of beneficial vegetation.

Most of the information on clopyralid, glyphosate, hexazinone, imazapyr, sulfometuron methyl, and triclopyr is taken directly from the HFQLG Forest Recovery Act Supplemental DEIS. When available, more current information from U.S. Forest Service Risk Assessments (SERA), EPA Reregistration Eligibility Decisions (RED), Product Labels, and Material Safety Data Sheets (MSDS) was incorporated. Information for 2,4-D and borax, the chemicals not described in the HFQLG DEIS, also came from these documents. The California Department of Pesticide Regulation (CDPR) Pesticide Use Report database was used to obtain a few of the commonly used trade names currently registered in California for Forestry and Rangeland use. These trade names are for example purposes only, and there is no intent to endorse the particular range of names listed.

### **2,4-D (2,4-Dichlorophenoxyacetic Acid)**

**Trade names:** 2,4-D L.V. 4 Ester, 2,4-D L.V. 6 Ester, Weedar 64, Weedestroy, Weedone

**Target plants:** annual, biannual and perennial broadleaf weeds and brush; grasses are tolerant if appropriate timing is used

**Target area on plant:** foliar applied; also an effective seed germination inhibitor (pre-emergent soil application)

**How the active ingredient works:** auxin growth regulator

**Typical application rates:** 0.5 - 4 lbs ae/acre (1lb ae/acre most common)

**Experience in California forestry:** 1940's

**Soil/water quality:** water soluble; has low binding affinity in soil; found to often have intermediate to high mobility in soil

**Human toxicology:** low to slight acute toxicity rating with the exception of the acid and salt forms being severe eye irritants; Carcinogenicity – Group D (Not classifiable)

**Wildlife/Aquatics toxicity:** slightly to moderately toxic to mammals (dogs more sensitive because of limited ability to excrete organic acids); practically non-toxic to moderately toxic to birds; practically non-toxic to honey bees; particularly nontoxic for 2,4-D acid/ salt formulations and ester formulations highly toxic to fish, aquatic invertebrates and amphibians

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**Most recent comprehensive risk assessment:** SERA 2006; EPA 2005

### **Borax (sodium tetraborate decahydrate)**

**Trade names:** Sporax

**Target plants:** Annosus root disease (*Heterobasidion annosum*). This fungus often infects freshly cut conifer stumps.

**Target area on plant:** top of freshly cut stump surface

**How the active ingredient works:** Inhibits growth of fungi by preventing production of conidia or asexual spores.

**Typical application rates:** 0.1 - 5 lbs Sporax/acre (1 lb Sporax/acre most common)

**Experience in California forestry:** CA forestry unknown. First pesticide using Boron 1948

**Soil/water quality:** boron is a naturally ubiquitous micronutrient found in low doses throughout waterways (water soluble) and soil; transforms rapidly into borates. Soil absorption of borate compounds varies depending on factors such as soil type and water pH.

**Human toxicology:** Borax products are Category I due to a high degree of acute toxicity for eye irritation effects; Oral, inhalation and dermal acute toxicity levels are moderate. Product does not constitute a hazard.

**Wildlife/Aquatics toxicity:** practically nontoxic to birds, fish and aquatic invertebrates, and relatively nontoxic to beneficial insects; risks to birds, fish and wildlife species are minimal given that boric acid has limited outdoor use, low toxicity, and is a naturally occurring substance.

**Most recent comprehensive risk assessment:** SERA 2006; EPA 1993

### **Clopyralid**

**Trade names:** Transline

**Target plants:** narrow range (in CA) including thistles and knapweed, but can affect composites, legumes, buckwheats

**Target area on plant:** most effective as post-emergent so foliar application best; little root absorption leads to only short term (30-45 days) pre-emergent effects

**How the active ingredient works:** auxin growth regulator

**Typical active ingredient application rate:** less than ½ lb. per acre

**Experience in California forestry:** extensive on private lands since mid-1990's

**Soil/water quality:** low potential for movement through soil

**Human toxicology:** moderate to low acute toxicity rating, not a carcinogen. An impurity in the technical grade material (hexachlorobenzene) is toxicologically significant (probable human carcinogen)

**Wildlife/Aquatics toxicity:** slightly to practically nontoxic to birds; practically nontoxic to fish and aquatic invertebrates; relatively nontoxic to bees, earthworms, spiders

**Most recent comprehensive risk assessment:** SERA 2004; U.S EPA approved Transline® label and Material Safety Data Sheet

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### Glyphosate

**Trade names:** Accord, Buccaneer, Gly, Glyfos, Glypro, Razor, Rodeo, Roundup

No aquatic labels are specifically listed for the Propose Program

**Target plants:** broad spectrum, effective against most woody and herbaceous plants

**Target area on plant:** foliar application

**How the active ingredient works:** aromatic amino acid biosynthesis inhibitor

**Typical active ingredient application rate:** 1-4 lbs. per acre

**Experience in California forestry:** extensive since late 1970's

**Soil/water quality:** Strongly adsorbed by soil particles; once in soil, does not move. Not detected in water when best management practices are implemented.

**Human toxicology:** slightly to practically non-toxic acute toxicity rating, not a carcinogen.

**Wildlife/Aquatics toxicity:** Practically nontoxic to mammals, birds, bees, aquatic invertebrates; slightly toxic to fish; formulated products with some surfactants show moderate toxicity to fish and other aquatic organisms.

**Most recent comprehensive risk assessment:** SERA 2003, EPA 1993

An impurity in certain formulations (1,4-dioxane) is toxicologically significant (probable human carcinogen).

### Hexazinone

**Trade names:** Velpar XP {Extruded Paste (XP) replacing Dry Flowable (DF) 2007}, Velpar L

**Target plants:** broad spectrum, controls many woody and herbaceous species

**Target area on plant:** Soil under or adjacent to target plant; a pre-emergent herbicide

**How the active ingredient works:** photosynthetic inhibitor (taken up by roots, then translocated to leaves)

**Typical active ingredient application rate:** 1-3 lbs. per acre

**Experience in California forestry:** extensive since the late 1970's

**Soil/water quality:** water soluble, mobile in soils and water. Has been detected in streams and shallow groundwater.

**Human toxicology:** slightly to practically nontoxic acute toxicity rating, not a carcinogen

**Wildlife/Aquatics toxicity:** slightly to practically nontoxic to fish, aquatic invertebrates, birds, bees

**Most recent comprehensive risk assessment:** SERA 2005, EPA 2004

### Imazapyr

**Trade names:** Arsenal AC, Chopper

**Target plants:** broad spectrum – annual, perennial grasses, broadleaf and woody plants (true fir, lodgepole pine, Douglas fir are tolerant, sugar and ponderosa pine less so; legumes are tolerant)

**Target area on plant:** foliar application, but also has some pre-emergent properties on grasses and annuals

**How the active ingredient works:** branched-chain amino acid biosynthesis inhibitor

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(AHAS/ALS); plant resistance can develop

**Typical active ingredient application rate:** less than 1 lb. per acre

**Experience in California forestry:** extensive on private land since mid-1990's

**Soil/water quality:** persistence in soil highly variable; potential for water contamination, although soil adsorption is high

**Human toxicology:** practically nontoxic acute toxicity rating, not a carcinogen

**Wildlife/Aquatics toxicity:** practically nontoxic to mammals, birds, fish, bees

**Most recent comprehensive risk assessment:** SERA 2005, EPA 2004

### Sulfometuron methyl

**Trade names:** Oust, Oust XP

**Target plants:** broad spectrum – annual, perennial; grasses, broadleaf plants (thistles are tolerant)

**Target area on plant:** soil under or near target plant, has pre and post emergent effects

**How the active ingredient works:** branched-chain amino acid biosynthesis inhibitor (AHAS/ALS); plant resistance can develop (sulfonyl urea family of herbicides)

**Typical active ingredient application rate:** less than ½ lb. per acre

**Experience in California forestry:** limited on private lands; potential issues with off-site non-target vegetation damage and possible conifer growth effects

**Soil/water quality:** Somewhat persistent in soil; movement through soil is possible; water contamination is possible; drift with wind erosion of topsoil possible

**Human toxicology:** low to slight acute toxicity rating, not a carcinogen

**Wildlife/Aquatics toxicity:** slightly to practically nontoxic acute toxicity to mammals, fish, birds, aquatic invertebrates

**Most recent comprehensive risk assessment:** SERA 2004, EPA Expected 2008

### Triclopyr

**Trade names:** Garlon, Redeem, Remedy, Pathfinder, Turflon Ester

**Target plants:** broad leaved and woody plants; not effective on grasses

**Target area on plant:** foliar application

**How the active ingredient works:** auxin growth regulator

**Typical active ingredient application rate:** 1-2 lbs. per acre

**Experience in California forestry:** extensive since 1970's

**Soil/water quality:** does not easily move through soil; not detected in surface water

**Human toxicology:** low acute toxicity rating, not a carcinogen

**Wildlife/Aquatics toxicity:** slightly toxic to mammals, birds, fish; slightly to particularly nontoxic to bees, and invertebrates (soil and aquatic)

**Most recent comprehensive risk assessment:** SERA 2003; EPA 1998